EXHIBIT 1

MASSACHUSETTS WATER RESOURCES AUTHORITY
Engineering & Construction Department
Consultant Management Group

MEMORANDUM

TO: Michael J. McBride, Deputy Chief Operating Officer

FROM: Patrick T. Barrett, Project Manager, E&C PTB

THROUGH: Kevin F. O'Brien, Director E&C KFOB

DATE: November 20, 2003

SUBJECT: Rehabilitation of East Boston Branch Sewer, Contract # 6840
Project Update

Introduction

The East Boston Branch Sewer Relief Project, MWRA Contract No. 6256 with Jacobs Civil Inc. (Jacobs), is part of the overall CSO Control Program for the MWRA. The East Boston Branch Sewer Relief Project involves CSO reductions at 10 CSO outfalls scattered along Chelsea Creek and Boston Harbor. The overall plan to reduce CSO activations in East Boston is to provide interceptor relief to the existing East Boston Branch Sewer (EBBS) by means of rehabilitation of the existing EBBS and the installation of a new interceptor relief pipe. Currently, portions of the overall plan are under re-evaluation to determine if the overall construction cost can be reduced through a combination of rehabilitation, interceptor relief/flow diversion, and sewer separation of portions of the Boston Water and Sewer Commission's combined sewer system in East Boston.

Rehabilitation of the East Boston Sewer , MWRA Contract No. 6840 with D'Allessandro Corp. (D'Allessandro), is one portion of the overall East Boston Project that has moved forwarded into construction. This construction contract will add to the structural integrity of the main branch of the EBBS (originally installed in 1895), and enhance the hydraulic characteristics of the EBBS. The improvement in hydraulic capacity is one of the key components in improving the overall hydraulics of the EBBS system and the reduction in CSO activations in East Boston.

The contract work includes the cleaning, televising, and rehabilitation of 5,400 linear feet of 36 ½ x 41½-inch upside-down horseshoe shaped sewer interceptor, rehabilitation of 475 vertical feet of manholes, and by-pass pumping of flows during rehabilitation.

The "AS-BID" price for this work was $5.142M. D'Allessandro was the low bidder. D'Allessandro began work on this project on March 31, 2003. This project has eight approved or proposed change orders to date totaling $342,000.

The method chosen to rehabilitate the main branch of the EBBS is known as Cured-in-Place Pipe (CIPP) lining. Instituform Technologies, Inc. (ITI) is the sub-contractor responsible for manufacturing and installing the CIPP lining at a subcontract cost of approximately $1.5 million. ITI began the installation of the CIPP lining in August of 2003, and completed the installation approximately five weeks later.

Cured-in-Place Pipe Lining Process

The CIPP process involves the installation of a resin impregnated felt tube into an existing pipe. Once the CIPP tube is in place, the resins are heated (generally by circulating hot water) to create a thermal reaction in the resins resulting in a hard, seamless pipe within a pipe.

The felt in the tube is used to hold the resins in place until the thermal reaction takes place. The resins are contained within the felt tube by a polyethylene lining. The CIPP felt tubes consist of multiple layers of felt linings that are stitched together, and then a polyethylene lining is applied to the outside. The resins are injected into the felt tube either at the factory or at the construction site. For this project, the resins were injected at the factory.

In order to inject the resins into the felt tube, holes are cut in the polyethylene lining and felt tube are cut in order to pump in the resin. To evacuate the air in the tube and to assist in the movement of the resin through the felt tube, vacuum holes are cut into the tube. Once the resin is in place, the holes are stitched over and covered with a polyethylene patch.

At the construction site, the resin-impregnated tube is lowered into the pipe to be rehabilitated and inverted so that the outer polyethylene lining becomes the inside of the rehabilitated pipe. The tube is forced into the host pipe by water poured into the inverted tube. Control of the level of the water in the tube (known as static head) is an important feature in controlling the rate of insertion and the opening of the felt tube so that the resin impregnated felt tube pushes tightly up against the side of the host pipe. The installed tube is then heated with re-circulated hot water until the resins are cured.

CIPP Installation Defects

During the early phases of the CIPP installation work on this contract, post installation inspection documented multiple "wrinkles" and "fins" in the CIPP lining. Wrinkles are

ridges/folds, which runs circumferentially around the lining and protrude only a small distance into the pipe. The fins are ridges/folds, which run laterally along the pipe and protrude 1 to 3 inches or greater, into the pipe. Some wrinkles are normally to be expected with this process, but the number of fins was of some concern to MWRA (E&C) and Jacobs. E&C and Jacobs met with ITI to review the issue. It was determined that the wrinkles were in fact normal, but that the fins needed to be removed. The reason for the removal of the fins was that they would inhibit the hydraulic improvement features that the CIPP lining provides. ITI stated that the removal of the fins by cutting would not be detrimental to the integrity of the lining, and that since the resins are cured, an epoxy coating over the cut fins would not be required. E&C and Jacobs allowed ITI to remove the fins.

ITI completed the CIPP lining installation process on September 15, 2003. As part of the requirement of the specifications, ITI inspected the CIPP lining by remote control TV inspection. This inspection was done from September 10 to September 15, 2003. At that time, the CIPP lining appeared to be in good condition and acceptable. However, subsequent work related to the removal of flow obstructions at the Caruso Pump Station required additional remote control TV inspection of the EBBS. It was during this subsequent TV inspection conducted on September 30, 2003, that defects not previously known were discovered in the CIPP lining.

The defects discovered were that groundwater infiltration was leaking through the CIPP lining. The lining by its nature is supposed to be impervious to infiltration. The leaks were occurring at the previously cut fins, the factory stitched resin injection and vacuum points, and the field seams.

Actions taken by E&C, Jacobs Civil, and ITI

When the leaks were initially discovered, E&C and Jacobs immediately notified ITI and requested ITI to conduct a complete TV inspection of the entire rehabilitated EBBS and to complete a detailed inspection of the leaks and CIPP lining. This was done immediately by ITI and the TV inspection was conducted overnight on October 2, 2003. The observed leakage raised questions regarding the integrity and acceptability of the CIPP lining installed between Station 10+23, Section 38 and Station 8+98, Section 37. On that day, Jacobs issued a Notice of Non-Compliance to D'Allessandro, noting the identified leaks directing D'Allessandro to perform a remote controlled TV inspection of the entire length of the CIPP lining. and directing D'Allessandro to provide a report detailing the areas that are not in conformance with the contract documents.

A meeting was held on October 6, 2003 with E&C, Jacobs, D'Allessandro, and ITI. The following was discussed:

- The remote control TV inspection tape from the October 2, 2003 was reviewed. By ITI's estimate, there were approximately 200 locations where leaks occurred within the 5,400 feet of CIPP lined East Boston Branch Sewer (EBBS).

- A discussion was held regarding the possible causes of the leaks through the CIPP lining and proposed repair methods to solve the leak problem.

- ITI indicated their initial investigation did not indicate a single specific cause for the failure of the CIPP lining. ITI noted that possible causes that ITI was investigating include:
  - Material failure of the resin, felt lining, or polyethylene coating;
  - Factory resin wet out procedures, polyethylene seals for stitched resin injection points and vacuum points;
  - Field seam splices;
  - Field installation procedures;
  - Cut fin and wrinkle sections;
  - Imperfections in the roller system used in the installation;
  - Static head on the down tube during installation; and
  - CIPP curing temperatures.

- ITI was directed to provide information pertaining to quality control during fabrication and installation of the CIPP lining as required by the contract documents. The following minimum information was requested:
  - Field reports generated by ITI and/or its subcontractor(s) during fabrication and installation of the CIPP lining;
  - Field reports generated by ITI and/or its subcontractor(s) during the resin impregnation process;
  - Temperature strip chart data taken during the heating, curing and cooling periods for each section of CIPP lining installed.

- ITI was instructed to obtain samples of the installed CIPP lining at 10 locations within the EBBS for testing and analysis. These locations were reviewed and agreed upon by all present at the meeting. ITI was also instructed to provide recommendations for repair methods to the CIPP lining based on results of tests and field observations. The samples were to be taken at locations of the leaking fins, resin injection points, resin vacuum points, and field seams. The samples cut from the CIPP lining were to be approximately 1 foot by 2 feet in size.

On October 6, 2003, ITI collected five samples of the CIPP lining. Due to the volume of groundwater entering the pipe during the cutting operations, ITI became concerned with the ability to stop the groundwater at the holes cut in the CIPP lining during repair. Jacobs Civil allowed ITI to only obtain five samples that day with the understanding that ITI would provide a procedure for repairing the holes. The cut samples were submitted for laboratory testing.

On October 7, 2003, ITI sent the samples to an independent third party testing facility to test the structural integrity of the samples in accordance with acceptable ASTM F1216.

ITI also submitted samples of the groundwater leaking through the CIPP lining for testing. During the sample retrieval period it was also discovered that there was one location where the CIPP lining had not cured. ITI cut the uncured lining from the tube for testing and a cured section adjacent to the uncured lining. ITI also sent these samples to the independent testing lab for analysis.

A construction progress meeting was held on October 8, 2003 with E&C, Jacobs, D'Allessandro and ITI. The following was discussed:

- E&C and Jacobs stated the previous CIPP lining acceptance was rejected.
- ITI presented a proposed repair procedure that included grouting of the soil surrounding the EBBS and the annular space between the EBBS and the CIPP lining. ITI indicated that the procedure was for "active" leaks and the cut sample areas. ITI anticipated this would be sufficient to cut off the groundwater infiltration.
- Jacobs expressed concern with the grouting pressures and the potential for damaging the CIPP lining.
- ITI indicated the grouting operation would be conducted by an applicator certified for the specific product proposed.
- E&C and Jacobs noted to ITI that any leaks within the CIPP-lined EBBS would not be acceptable.
- ITI was also directed to obtain three additional samples from the CIPP lining for testing.
- As part of this meeting, a discussion was held as to the suitability of the proposed grout for this repair method and the ability of the grout to react chemically with the contaminates in the surrounding soil and groundwater.

On October 8, 2003, Jacobs, ITI and the grout manufacturer held a telephone conference to discuss the grouting concerns. It was determined that the grout would be suitable for stopping leaks from entering the pipe from the surrounding soils, but may not be able to stop groundwater from migrating through the annular space between the CIPP lining and the host pipe without additional procedures. With respect to the ability of the grout to chemically react with contaminates in the soil, the grout manufacturer indicated that the grout proposed is used in many applications and did not feel that the contaminates would be an issue.

ITI was allowed by E&C and Jacobs to proceed with attempts and modifications to the proposed grouting procedures to determine the best method for stopping the leaks at the cut samples.

On October 8, 2003, ITI and its grouting subcontractor, New England Pipe Cleaning Company (NEPCCO), began sealing off infiltrating water at the cut sample locations in preparation for epoxy repair and at other weeping/leaking areas along the CIPP lining. The water cut-off techniques used consisted of sealing the annular space with oakum, sealing leaks in brick face with oakum, injecting Avanti AV100 chemical grout between the CIPP lining and brick, and drilling through the brick of EBBS and sealing water infiltration at the brick/soil interface. The cut sample repair work and annular space grouting work continued until October 24, 2003.

On October 10, 2003, ITI collected samples for laboratory analysis of the groundwater infiltration residue buildup that collected on the inside of the CIPP lining at the weeping and leaking areas.

On October 11, 2003, ITI measured the circumference, height, and width of the EBBS CIPP lined interior both upstream and downstream of all 18 manholes.

A meeting was held on October 13, 2003 with E&C, Jacobs, D'Allessandro and ITI. The following was discussed:

- ITI provided test data and a handout showing the locations where samples were taken on October 6, 2003 and summarized the test findings. The following summarizes those discussions:
  - The ASTM F1216 test procedure for measuring flexural strength of the CIPP samples allows five specimens from one sample to be tested and the average value used to indicate pass/fail of the test sample.
  - ITI reported the average for the test samples passed on this basis. However, it was noted several of the individual test specimens did not meet the 4,500 psi specification requirement.
  - ITI stated the data indicate the lining appears to be structurally sound and the problem is to stop the water infiltration.

- ITI reviewed the issues and presented additional proposals for repair of the CIPP lining. In addition to the possible causes of the leaks through the CIPP lining as identified at the previous meeting, ITI indicated that they are investigating the following:
  - ITI's International Standards Organization (ISO) Quality Control documentation to confirm or reject the possibility of material failure, human error, and/or equipment error in the factory manufacturing process;
  - Polyethylene adhesion differences between a new polyethylene coating used on this lining versus a polyethylene coating used on other previous CIPP installations;
  - Non-circular installation forces due to the non-circular shape of the EBBS;
  - Differences in European versus US manufacturing procedures;

- Static head differences on the downtube during installation based on a review of the field records;
- Possible creep of the CIPP lining.

On October 15, 2003, ITI and its grouting subcontractor NEPCCO began applying the epoxy repair at the cut sample areas where groundwater infiltration appeared to be effectively cut-off.

On October 20, 2003, bulging of the CIPP lining was identified as a result of the grouting operation over-pressurizing the annular space at several locations. On October 21, 2003, ITI attempted to push the bulged areas back into place by jacking. Another bulged area was identified on October 23, 2003 and was jacked back into place by the same procedure.

On October 22, 2003, a meeting with E&C and Jacobs was held to discuss the repair proceedings and to prepare for the Jacobs internal inspection of the entire CIPP installation. The following was discussed:

- E&C noted the internal inspection equipment needs to be provided by D'Allessandro. E&C requested Jacobs to develop an infiltration testing procedure for use by D'Allessandro and ITI. Jacobs prepared this procedure and provided it to D'Allessandro.
- Concerns for buckling of the CIPP lining at the locations of the bulges was discussed. Jacobs would look for fractures in the CIPP lining in the vicinity of the bulges to identify any potential problems.
- E&C noted that whatever repairs are made, a follow-up inspection by D'Allessandro will be required before the end of the warranty period. It was discussed that this inspection would be required sometime between 6 months to 1-year after the final repairs are made.
- E&C and Jacobs discussed the possibility of obtaining a Performance Bond from D'Allessandro or ITI for longer than the one year warranty period.

On October 24, 2003, ITI completed a post-grouting inspection and concluded that all repair work of the defects in the CIPP lining were completed in accordance with the previously reviewed procedures. ITI installed a V-notch weir to prepare to measure remaining infiltration in accordance with the procedure provided by Jacobs. On October 27, 2003 ITI informally reported a reading from the V-notch of 1,660 gpd, which was below the allowable infiltration rate of 50-gpd/inch diameter/mile, in accordance with ASTM F1216 allowable leakage rate.

On October 28 and 29, 2003, Jacobs and ITI jointly conducted an internal inspection of the CIPP lining with the assistance of D'Allessandro. Findings from this inspection were submitted to ITI through D'Allessandro on October 31, 2003. The inspection identified continued leakage at several locations, two bulges, apparent voids between the CIPP

lining and the EBBS brick pipe based on hammer soundings, and two additional soft areas in the crown. Jacobs directed D'Allessandro to perform additional work to correct defects in the CIPP lining and to submit the repair procedure if methods other than those used to date were proposed by ITI. D'Allessandro was informed that a Massachusetts registered Professional Engineer must certify in writing that the CIPP repairs meet the contract document requirements and that the repairs will last for the 50 year useful life specified for the CIPP lining. D'Allessandro was also notified that the cost for repair or replacement of the lining, including the cost of bypass pumping, odor control at the Caruso Pump Station, extension of the City of Boston street opening permits, final pavement and restoration, and cost escalation was the responsibility of D'Allessandro at no additional cost to the MWRA.

On October 28, 2003, ITI found the V-notch weir had dislodged due to backup in the downstream EBBS.

On October 30, 2003, a meeting was held with E&C and Jacobs to discuss the inspection findings. The following was discussed:

- E&C requested a letter from Jacobs to D'Allessandro, stating their inspection findings and concluding that the CIPP repairs were not acceptable due to an apparent loss in internal diameter, structural deficiencies, potential for future failure, and the bulges that remain.
- E&C noted the letter should reiterate that D'Allessandro and ITI need to submit written information on the reasons for the defects that was requested previously, but not provided by ITI.

A meeting was held on November 4, 2003 with E&C, Jacobs, D'Allessandro, and ITI. The following was discussed:

- ITI provided a map of the EBBS showing locations of cut samples.
- ITI provided an overview of their latest understanding of the problem and committed to repairing the CIPP lining. ITI reiterated the CIPP lining continues to be structurally sound, but that additional cut samples of the lining would be taken to verify this.
- ITI discussed possible causes of some of the defects. Specifically, at areas of apparent soft crown, ITI noted one section appears to be caused by water getting between the CIPP tube polyethylene lining and the CIPP tube felt system before complete curing of the resin occurred. Also, at another area, ITI indicated this is indicative of the CIPP lining tail section fusing to the crown during the curing process. During dewatering, the crown can be pulled down by the fused tail section. ITI noted that they have seen this type of defect in other CIPP installations.
- ITI noted that relining of the 5,400 would take 4 to 6 months to remove the existing CIPP lining and install a new CIPP lining. ITI also noted safety concerns with removing the lining and exposing workers to possible injury from the cutting process.

ITI noted it was not practical for them to consider removal of the CIPP lining for the entire length.

- ITI stated that they believe some reaches are acceptable.
- ITI stated that they intend to repair all factory and field sealed resin injection and vacuum ports because these appear to be a major defect. ITI also noted that the bulged areas would be replaced because the bulges are an indication of a structural deficiency.
- ITI noted the possible causes of these defects are being investigated. But they noted it may be due to water getting behind the polyethylene lining during inversion causing a separation of the felt layers or due to the cutting of the felt lining during the resin injection procedure. ITI noted they are looking at modifying this procedure so the various felt layers are cut at different angles in an attempt to reduce the potential of future similar problems in other installations.
- ITI discussed the possibility of using ITI's new structural panel procedure for the repair. ITI noted that these panels are not feasible at this time because of the non-circular shape of the pipe and the lead-time needed to manufacture the panels. The non-circular dimensions of the EBBS would require a special form for each repair area, and this would not be practical.
- ITI agreed to take measurements along the entire CIPP lined EBBS to estimate the flow capacity of the installed lining. ITI stated that it would submit a procedure for review and approval. They also noted that they were investigating more sophisticated techniques than a common tape measure.
- ITI noted that it is considering proposing the Warren Environmental System (WES) epoxy spray-on system for a repair procedure. ITI indicated they have recently worked with WES for similar repairs.
- ITI indicated that they intend to continue grouting to cut-off infiltration and ultimately to test for infiltration against the ASTM F1216 infiltration criteria.
- E&C reiterated that D'Allessandro remains responsible for the work and is required to complete this repair effort at no additional cost to the MWRA. This work includes odor control, bypass pumping, and street opening permit issues.
- ITI indicated that they expected the repairs to take 3 to4 weeks, once the approved repair procedure was identified.
- E&C reiterated they are awaiting a letter from ITI on the investigations completed to date that identify the likely causes of the CIPP lining defects. ITI noted that they continue to work on the requested documentation and would provide this when it is completed.
- E&C reiterated ITI would need to submit (through D'Allessandro) a certification by a Massachusetts PE that the repair has a 50-year life expectancy.

On November 5, 2003, ITI cut out three CIPP samples for laboratory testing and began cutting the bulge area before the repair procedures were approved. Work was stopped until a procedure is submitted by ITI and approved. ITI submitted a proposed procedure on November 7, 2003 by email and facsimile.

A meeting was held on November 10, 2003 with E&C, Jacobs, D'Allessandro, ITI, and WES to discuss ITI's proposed repair procedure. The following items were discussed:

- ITI proposed using WES to repair the bulge areas, resin injection and vacuum ports, and remaining cut sample areas.
- ITI and WES acknowledged that the WES had not been used previously to repair similar CIPP lining defects, except for a small project completed the past weekend.
- WES noted several reports completed to date that confirm the WES structural properties.
- E&C and Jacobs noted concerns regarding means to cut-off infiltration before applying the WES or any other epoxy type system. These same issues were evident during the previous attempts at repairing the CIPP lining using an epoxy type system.
- E&C and Jacobs reiterated the final repair must be certified in writing by a Massachusetts PE that the useful life will meet the 50-year duration specified.
- ITI acknowledged that the proposed repair procedure was inadequate and that it would re-evaluate the long term repair required.
- ITI also noted it is pursuing more definitive means to measure the internal diameter of the CIPP lining as requested by E&C and Jacobs to confirm the CIPP lining does not have significant voids between the lining and the brick EBBS and that the hydraulic capacity of the CIPP lined EBBS is as approved in previous ITI submittals at the beginning of the project.

On November 11, 2003, ITI measured the internal dimensions of the CIPP lining in increments of 50 feet by hand-held tape measurements. This information was not submitted to E&C or Jacobs for review. E&C and Jacobs had previously noted that this type of measurement was not acceptable.

On November 14, 2003, ITI requested Jacobs review a new method based on "state-of-the-art" technology to measure the internal diameter of the EBBS. Jacobs reviewed the proposed method on November 15 and 16, 2003. The method uses lasers and computer software to accurately measure the cross-sectional area of the CIPP lined EBBS at 5-foot intervals. ITI intends to begin this procedure on November 19, 2003.

Current Events

ITI is developing a plan to complete a cross-sectional analysis of the entire project length. ITI has contacted "HydromaxUSA" to measure the interior of the CIPP lining. HydromaxUSA has suc-contracted Colmatec of Montreal Quebec, Canada to assist in obtaining the interior pipeline measurements. Colmatec has developed a system called "Cool Vision" which incorporates lasers and imaging software to create an internal

profile of pipes. The inspection of the pipe using the "Cool Vision" technology commenced on Wednesday, November 19, 2003.

Based on the success of this inspection, a new corrective action plan will be developed by ITI for Jacobs/E&C review.

Use of the WES epoxy system has been discontinued pending cross-sectional analysis and development of a water control plan. ITI has proposed using a polyurethane repair method. Jacobs has initiated a review of this method, including historical use by the MWRA of using polyurethane products on other MWRA projects. Jacobs noted that the polyurethane product was rejected as a repair method for the CIPP in a pre-CIPP installation ITI submittal in June/July of this year for the EBBS project

Due to an odor complaint by the Manager of the City of Chelsea, plans are being developed to move the discharge location of the by-pass piping to the downstream side of Caruso Pump Station.

Potential Cause of Problem

The problems discovered in the CIPP lining of the EBBS may have had a number of causes including:

- A problem with the manufacture of the CIPP Resin impregnated tube, as indicated by the leaks from the resin Injection and vacuum points.
- The hydraulic static head used during the installation process may have been unsatisfactory, as indicated by the wrinkles and fins.
- The resins may not have been as specified by the contract documents as indicated by the possible displacement of the resins.

Discussions with several people experienced with the installation of CIPP suggest that an improper level of hydraulic static head may be the main cause of the problem. The static head used during the installation process may have been either too high, or too low.

A static head that was too high could have forced the resins to be squeezed away from certain sections of the CIPP tube before curing, thus making the CIPP lining thinner than designed. The higher head could also have forced the factory stitched resin injection and vacuum points to split and open up, thus allowing groundwater to leak into the lining.

A static head that was too low may not have forced the CIPP tube up against the wall of the host pipe sufficiently before curing, thus allowing for space larger than normal to be left between the CIPP lining and the host pipe and allowing for groundwater to be

trapped. The low static head could also attribute to the wrinkles and fins found in the pipe.

Use of improper resins may also be the problem. The specifications required that the viscosity of the resins meet specific requirements. This was done so that the resins would not "run". That is, they would not flow down the side of the tube to the bottom during the installation process, or the flowing would be kept to a minimum. The specifications called for a "premium" resin that would not run or mix with groundwater. There are indications that the resins did run. ITI prefers the term "displaced", and noted that the resins would be displaced if the groundwater were under pressure. The higher pressure could be from a higher than expected static head.

The investigations and testing currently being conducted by ITI may indicate the actual cause of the problem. E&C and Jacobs are awaiting the results of the testing. In addition, records of ITI's down tube hydraulic head monitoring records will be obtained and compared to observations made by E&C and Jacobs inspectors. Also, samples of the resin batch used in the CIPP tube will be obtained and tested. A spectrograph test will help determine if the resins used were what was specified and approved for the project.

Potential Correction of the Problem

There are a number of options for correction of the problem found.

- "Plug" all active leaks.

E&C and Jacobs believe that other leaks will develop in the near and long term. MWRA specified a leak-proof lining system in the contract documents and as is standard in the CIPP lining industry. If ITI is allowed to plug just the active leaks, MWRA will need to monitor the condition of the lined EBBS. ITI will need to be mobilized to plug additional leaks as they are found. This option could require a new by-pass pumping system to be installed to allow this work. The by-pass pumping system for the EBBS Project is expensive and complicated.

- Grout between the lining and the host pipe for the entire length of the lined EBBS

This option would be time consuming. In addition, there are no guarantees that all leaks will be stopped. There is also the risk of causing additional damage to the CIPP lining.

- Reline portions of the EBBS.

ITI would line over the existing lining. This option may be the fastest and easiest correction. However, one of the main reasons for lining the EBBS was to improve the

overall hydraulics of the EBBS system in order to reduce CSO overflows into Boston Harbor. Calculations indicate that the single-lined EBBS as-designed improves the carrying capacity of the EBBS by approximately 10% over the unlined brick pipe carrying capacity. Should an additional lining be installed, the carrying capacity of the EBBS will be reduced by approximately 3 to 6 % over the original unlined brick pipe. This reduction in capacity is not expected to be acceptable.

- Remove the recently installed lining and install a replacement lining.

This option in Jacobs opinion may take 8 to 12 months to accomplish. This option would require the by-pass pumping system to remain in operation, not allowing the CA/T project to complete their work along Bremen Street, and causing additional impacts to the public for as long as a year.

Summary

Discussions continue between D'Allessandro, ITI, Jacobs, and E&C on means and methods of repair (grouting, water control, relining) that may be necessary to complete the project to the standards originally required by the contract documents.

The internal measurement inspection commenced on November 19, 2003 and is anticipated to be completed by November 21, 2003. The results of the inspection are to be available by November 25, 2003 with a meeting to be held to discuss inspection results and corrective action.

cc: M. Delprete, E&C